

VANCOUVER ISLAND, B.C.

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THE first view of Vancouver Island, whilst coasting northwards along the western coast of North America, is obtained between the parallels 48° and 49° N. lat., and about 125° W. long. The voyager may behold, rising in the distance, a bold and rugged outline of what appears to be the inhospitable shore of a wild country.

Eastward, stretching on the left hand far into the north-west horizon, is a mountainous range, rising abruptly from the ocean: rugged and broken, presenting an outline of varied mountain scenery—"the sharp solitary peak, the broken sierra, and the rounded dome-shaped mass, reflecting in the western sunlight, from their various surfaces and angles, the rays of light in infinite variety of hue, from the dark indigo of the lower ranges to the rosy purple of the peaks."

Entering the Strait of Juan de Fuca, which is not more than ten or twelve miles in width, and passing the Cape Flattery lighthouse, the voyager sees on the right hand the snow-capped range of Olympia, its dark and frowning precipices descending gloomily to the shore. On the left hand, reflecting a purple light, the metamorphic and trappean rocks of Vancouver, with a fringing belt of yellow sandstone; and sweeping on for about sixty miles, he sees before him Race Rocks lighthouse, beyond which a magnificent panorama opens to his view—a picture which, viewed by the warm sunlight of a fine autumnal day, can nowhere be surpassed for beauty of outline or richness and variety of colouring.

The rounded trappean hills of Vancouver Island are in full view on his immediate left, covered nearly to the summits by thick vegetation, the purple tints of the bold, outstanding rocks mingling in harmony of tone with the dark green of the pine and the oak; while below, in the valleys and lower grounds, the cool greys of the rounded rock masses,

fringed by a thick carpet of purple-brown fern, join with the autumnal orange tints of the maple, and the bright, yet tender, green of the alder and the willow, to form a mass of colour on which the eye dwells with delight.

From port San Juan, through the Strait of Fuca, eastwards, the coast is bold and rocky; numerous creeks and inlets, however, give protection to small craft, and Sooke Inlet is well adapted for coasting vessels and small steamers.

Before reaching Esquimalt harbour, distant eight and a half miles from Race Rocks lighthouse, an undulating, parklike country, backed by wooded hills of moderate height, appears in view, forming a succession of low, rounded, rocky promontories, with outlying reefs and islands. Esquimalt harbour, the headquarters of the British fleet on the Pacific coast, is a safe and excellent anchorage for ships of any size, and with the aid of the light, which marks the western point of entrance, may be entered at any time with great facility. The extent of the harbour is about three miles by two, with an average depth of from six to eight fathoms. It has a commodious and large dry dock, and is well fortified. A branch of the Esquimalt and Nanaimo railway connects at one side, and around the whole harbour numerous rocky promontories, with outlying islands and gently sloping sandy bays, form the chief feature of the scene.

Victoria harbour is a little more than two miles eastward of Esquimalt. The entrance is described as "shoal, narrow, and intricate, and with SW. or SE. gales a heavy rolling swell sets in on the coast, which renders the anchorage outside unsafe; while vessels of burthen cannot run in for shelter unless at or near high water. Vessels drawing fourteen or fifteen feet of water may under ordinary circumstances enter at such times of tide, and ships drawing seventeen feet have entered, though only at the top of spring tides."

The foregoing quotation was written some years ago. Since then many improvements have been made. An outer harbour has been constructed, where Australian and the Chinese line of C. P. railway steamers can call, and the town of Esquimalt is connected with Victoria by an electric tramway.

The celebrated Captain George Vancouver, whose name the island now bears, describing a portion of this locality in 1792, says:—"To describe the beauties of this region will, on some future occasion, be a grateful task to the pen of the skilful panegyrist. The serenity of the climate, the innumerable pleasing landscapes, and the abundant fertility that unassisted nature puts forth require only to be enriched by the industry of man, with villages, mansions, cottages, and other buildings, to render it the most lovely country that can be imagined, whilst the labour of the inhabitants would be amply rewarded by bounties which nature seems ready to bestow on cultivation."

Such were the conclusions which Captain Vancouver came to one hundred and seven years ago. They appear to be correct. Although portions of Vancouver Island convenient to the coast are taken up and settled, much of the country is still unoccupied and even unexplored, still

open as it was in the days of Vancouver, calling for the labour of man to regulate its wild luxuriance and develop its latent wealth.

Vancouver Island is of an elongated, oblong form, running NW. and SE., in length about three hundred miles, with an average breadth of thirty to fifty miles. Its outline is boldly picturesque; its shores are characterised by abrupt cliffs, rocky promontories, magnificent harbours, sheltered coves, and pebbly beaches. Its surface is beautifully diversified by mountain precipices, hill and dale, and undulating prairies, the tame-ness of which is broken by numerous bosses of trappean rock, which rise on every hand, and round which the gnarled oak spreads its leafy arms, affording a grateful shade in the summer sun.

The general feature of the landscape in such localities is said to be very similar to many parts of Devonshire, more especially to that on the eastern escarpment of Dartmoor, and the resemblance is rendered more striking by the numerous stone circles which lie scattered around. The trappean rocks, which in Vancouver Island take the place of the granite of Devon as giving feature to the scene, furrowed, grooved, and scratched by ice action, point to a period far back in time when a submerged land lay under a Boreal ocean, and these stone circles point to a period in ethnological history which has no longer a place in the memory of man.

These stone circles are found scattered in irregular groups of from three or four to fifty or more, crowning the rounded promontories over all the south-eastern end of the island and as far north as Comox. Their dimensions vary in diameter from three to eighteen feet; of some only a single ring of stones marking the outline now remains.

In other instances, the circle is not only complete in outline, but it is filled in, built up as it were to a height of three to four feet, with masses of rock and loose stones collected from amongst the numerous erratic boulders which cover the surface of the country, and from the gravel of the boulder drift which fills up many of the hollows.

Whatever those structures may have been intended for, they are evidently of considerable antiquity, and have for a long time been dis-used, for through the centre of many the pine, the oak, and the arbutus have grown up and attained to full growth. Recently a number of these mounds have been opened and examined by the members of the British Columbia Natural History Society, and whilst some did not contain any-thing, in others remains of human skeletons were found, so it has been concluded that the circles were places of sepulture of an extinct race, as the natives found in the country by Captains Cook and Vancouver could not give any explanation regarding them.

In the succession of its seasons and general thermal conditions the climate of Vancouver Island approximates closely to that of Great Britain. Its situation being close to a continent, the mountain ranges of which are capped with perpetual snow, and surrounded by an ocean remarkable for its extremely low temperature, certain local peculiarities present themselves, and these are specially marked at the south-east end of the island, owing to its proximity to the Olympian range of mountains in Washington State, across Fuca Strait. That range, which runs east and west, presents its northern aspect to Vancouver Island, and as on this

aspect the snow remains on the mountain peaks all the year round, the winds which blow from that direction are occasionally cold and chilly.

On a clear, summer day, when the direct rays of the sun are scorching, and labour or exercise on the dry and heated surface of the earth is overpowering, a gentle, southerly breeze may be blowing—so gentle as not to make itself felt, yet so cold as to make the heated traveller long for an extra covering if he seeks the shade. In like manner to the hot day succeeds the cold night. The heat obtained from the calorific rays of the sun during the day is quickly radiated from the surface of the earth, and down from the mountain peaks comes, creeping, the heavy cold air to spread itself over the surface of sea and land.

The winter season in Vancouver Island may be characterised as open and wet. There are exceptional seasons, but from the middle of November until April rains are frequent. During this period the appearance of the landscape is gloomy. The sombre, dark green foliage of the pine throws a heavy shadow on the bare rocks; the warm brown carpet of fern has in a great measure disappeared; the bramble has died down; the thickets of rose, of raspberry, and of sweet briar are but naked skeletons, and nothing is left to gladden the eye but the graceful clusters of the wax-like snowberry, contrasting with the beautiful green of the young and springing pines.

Winter begins to disappear in the month of March, and bursting from the teeming earth with the first warmth of spring and early summer numerous bulbous plants raise their beautiful heads, arrayed in the loveliest colours, to welcome the coming season. "The delicate lilac petals of the *Kamass*, the beautiful *Collinsia*, with its starry eye, bringing to remembrance the Forget-me-not of the old home, the graceful *Trillium* in its glossy setting of dark green leaf, and amongst the broken rocks and gnarled roots of trees, springing lightly on its delicate stem, the graceful, drooping *Erythronium*, or dog-tooth violet. The wild *Ribes*, with its scarlet blossom, gives early evidence of life, and amongst the dead leaves of a bygone year smiles a bright encouragement and welcome to the opening buds. The spring grass and young shoots of the fern give a covering of tender green to the earth, over which during the dark months of winter the solemn pine has been brooding; the oak unfolds its leaf, the maple gently opens into day, the willow, alder, and aspen fill the hollows with their yellow-green light, the gooseberry and the currant, the raspberry and the rose, in their native thickets burst into leaf and blossom." The writer from whom I quote the foregoing, and to whose descriptions I am much indebted, further remarks: "Numberless minute but lovely flowers spring through the grassy carpet, or, in groups of rich and gorgeous colouring, irregularly scattered by Nature's hand, clothe the but now dead and naked rock with a bright mantle. The surface of the earth is teeming with life, and the air is redolent of the odours of a thousand blossoms, and the face of the whole country sweeping on in graceful undulations, is literally 'a garden of roses.'"

In the months of June and July vegetation attains its most vigorous growth, and its progress is most remarkable. In August and September the want of rain begins to be felt, the summer heats parching the ground

and scorching the pastures. After the break of the season the fine weather of the later autumn (the Indian summer) sets in, and the mellow tints on leaf and spray give the chief charm of the year to the lovely landscape, while they proclaim that its beauty is for a time about to pass away. The autumn of the American climate is finer than that of the European, and the fine weather (the Indian summer) extends further into the year. The winter months, in ordinary seasons, are much the same as in the west of England; in the severer and exceptional, like the Midland counties and east coast of Scotland.

Northerly winds occasionally prevail, and, for such a latitude as Vancouver Island, are quite exceptional in their character, being hot and dry. Blowing gently from the north, they sweep over the land heated by the rays of the summer sun, and gathering fragrance in the pine woods as they pass, they fill the air with a transparent haze, and give an almost tropical appearance to the landscape. The prevailing winds during the summer months are from south-west and north-west—blowing freshly during the day, the nights being tranquil and clear.

The geological structure of Vancouver Island, owing to practical difficulties, can only be arrived at by deductions from partial observations, such as are afforded by sections on the coast, by ravines, water-courses, and mountain summits. It is impossible in the summer months to penetrate the valleys, covered by a thick vegetation, to any good purpose, and in the winter months the task is too arduous, if not impracticable. Enough, however, is known and apparent to show the general geological character of the island. All geological evidence tends to prove that the last upheaval of North America and the outlying islands in the Pacific was slow and gradual, occurring in the Post-Pleistocene or most recent Tertiary epoch.

Vancouver Island and its dependencies or outlying islands form a barrier against the powerful effects of the violent storms which rage along the coast in the later autumnal and early spring months, together with the sweeping currents, which, rushing irregularly in all directions, carry everything but the hardest rocks before them. Without such protection as is thus afforded, the loose, friable materials from Burrards Inlet southwards must have been long since swept away. Acting, therefore, as a protecting barrier, an axis of metamorphic gneissose rock is found in the south-western extremity of the island, having above it clay slates and Silurian deposits, or, at all events, rocks of the Palæozoic age. A black, bituminous-looking slate is brought from that locality, as also from Queen Charlotte Islands, which is used by native Indians in making carved ornaments.

"A great deposit of clay slate has existed along the whole south and west, but, shattered and broken up by intruded trappean rocks, it has been almost entirely removed by the subsequent glacial action which grooved and furrowed the dense crystalline felspathic traps. Masses of lenticular or concretionary limestone are interspersed throughout this formation, and afford good lime for economic purposes. Along with the traps, other rocks of igneous origin have been erupted, and at the Race Rocks a remarkably beautiful dark green hornblende rock is found,

studded with large and perfectly formed crystals of quartz. The sedimentary rocks are—carboniferous sandstones and grit, limestones and shales, of both the Cretaceous and Tertiary ages. These in patches fringe the whole coast from the extreme north, round by the Strait of Fuca to Nootka Sound, and enter largely into the formation of the numerous outlying islands in the Gulf of Georgia.

"As shown by the associated fossils, the coal-field of Nanaimo is of Cretaceous age—the whole deposit has undergone many changes of level, numerous extensive faults existing. Upheaval, subsidence, and denudation had all done their work on the dense crystalline rocks of the axis of the island, and on the Cretaceous beds of Nanaimo, long before the Tertiary sandstones and lignites were elevated by the slow upheaval of the Post-Glacial period. Associated with this coal-field, and scattered over the neighbouring islands, are numerous nodules of septaria, a calcareous clay charged with iron, of great value as a hydraulic cement. Copper pyrites and peroxide of iron are found in various localities giving promise of mineral. At Barclay Sound, on the south-west coast, in the metamorphosed rocks of that locality, another pyritic ore of copper has been found, as also at Cowichan on the east coast. Traces of gold are to be found in the clay slates and permeating quartz veins, disseminated in fine particles throughout the mass, and also as auriferous iron pyrites."

Mining for gold has not as yet been carried on to any great extent in the island. The same may be said respecting copper and iron. Of coal and coke the British Columbia Board of Trade annual report just issued says:—"The output of 1,135,865 tons of coal for 1898 was the largest on record. The exports were principally to California, 765,686 tons, but other shipments went to Alaska and the Hawaiian Islands. The Vancouver Island coal maintains its hold on the California market, and still represents about one-third of the imports to that state. The total number of hands employed in coal mining in 1898 was 2841. The Vancouver Island collieries produced about 35,000 tons of coke, which was mostly used for smelting purposes; 3167 tons were exported."

It is unfortunate that the iron deposits are not properly developed. It is believed that some properties offered as iron mines will be found to contain copper when thoroughly exploited. There have been inquiries for iron recently. A gentleman connected with an iron mine near the east coast of Vancouver Island writes to a Victoria, B.C., paper, the *Colonist*, a few days ago, and says:—"In Victoria some of the most influential people were hard at work at the time of the writer's visit in an effort to induce British capital to invest in iron and steel industries on the island. The Government of British Columbia has passed a law providing for a bonus of \$2 for every ton of pig-iron, and \$4 for every ton of finished iron and steel which may be produced in the province."

There is no question that the necessary raw materials for the production of pig-iron can be found in British Columbia. On the eastern coast of Vancouver Island, and just north of the 49th parallel, at Nanaimo, there are large coal-fields which have been opened up, and are producing bituminous coal which is well suited for coking. From Nanaimo there is a railroad extending south-east to Victoria. In

several other places on the island good deposits of coal have been found.

Iron ore of very rich quality has been found in a number of places. Probably the best and most accessible deposits are to be found on certain islands in Barclay Sound, which is on the south-west coast of Vancouver Island, and only about fifty miles over the water from the nearest point of the State of Washington. In the Straits of Georgia, which separate Vancouver Island from the mainland of British Columbia, are Texada and Redonda, which contain good deposits of iron ore. On the coast of the mainland, at Rivers Inlet north of Vancouver Island, are also deposits of ore.

On Tzartoos Island, in Barclay Sound, where, as has been said, are the most accessible deposits, there is a mine already opened up, which the writer visited. On that island is a peak about 1000 feet above sea-level, which, to a distance of about 150 feet from its top, seems to be a mound of solid iron ore. At a lower point, where the hill is about a mile in circumference, a heading is driven into the hill for about 50 feet, and is about ten feet wide. The writer has a number of specimens which he secured from this heading. The ore is granular and magnetic, with thin veins of limestone running through it. The foot of the hill is about 600 feet from deep water, and the lie of the land is such that a wharf could be built so that large ocean steamers or scows could be brought up to a position where the ore could be dumped down a chute and fall directly in. It has been estimated by experienced mining engineers that this deposit contains about five million tons of ore. Of this ore there are given below six analyses, made as follows: No. 1, by Mr. Dewanap, mining engineer and chemist, at Seattle, Washington; No. 2, by the Government office at Vancouver; No. 3, by the Cleveland Steel Works, at Middlesborough, England; No. 4, by Dr. Otto Wuth, Pittsburgh; and Nos. 5 and 6, by Mr. G. M. Godspeed, chemist of the National Tube Works, M'Keesport:—

	1	2	3	4	5	6
Iron, . .	64.00	64.01	66.60	66.62	67.98	69.160
Silica, . .	7.35	...	2.00	...	2.67	1.500
Alumina, .	0.52	...	...	0.14	...	...
Sulphur, .	0.0054	0.008	0.02	0.006	Trace.	Trace.
Phosphorus,	0.0071	0.01	0.01	0.003	0.008	0.007
Lime, . .	3.76	...	4.00	...	3.000	0.250
Manganese, .	Trace.	...	...	...	0.250	0.160
Magnesia, .	...	...	...	...	1.150	0.120

"The duty on iron ore imported into the United States is 40 cents a ton, but the freight charges would be light, as it is only a short distance by water from Barclay Sound to a point on Juan de Fuca Strait on the American side. The cost of mining would be light, as all the deposits mentioned as being near tidewater are above sea-level, and they could be mined by the steam shovel, some of them requiring stripping. The ore could be conveyed into a chute which would carry it to the steamer or scow in the quiet water of the sound, and there is only a short distance of open sea which the scows would have to traverse to reach Juan de

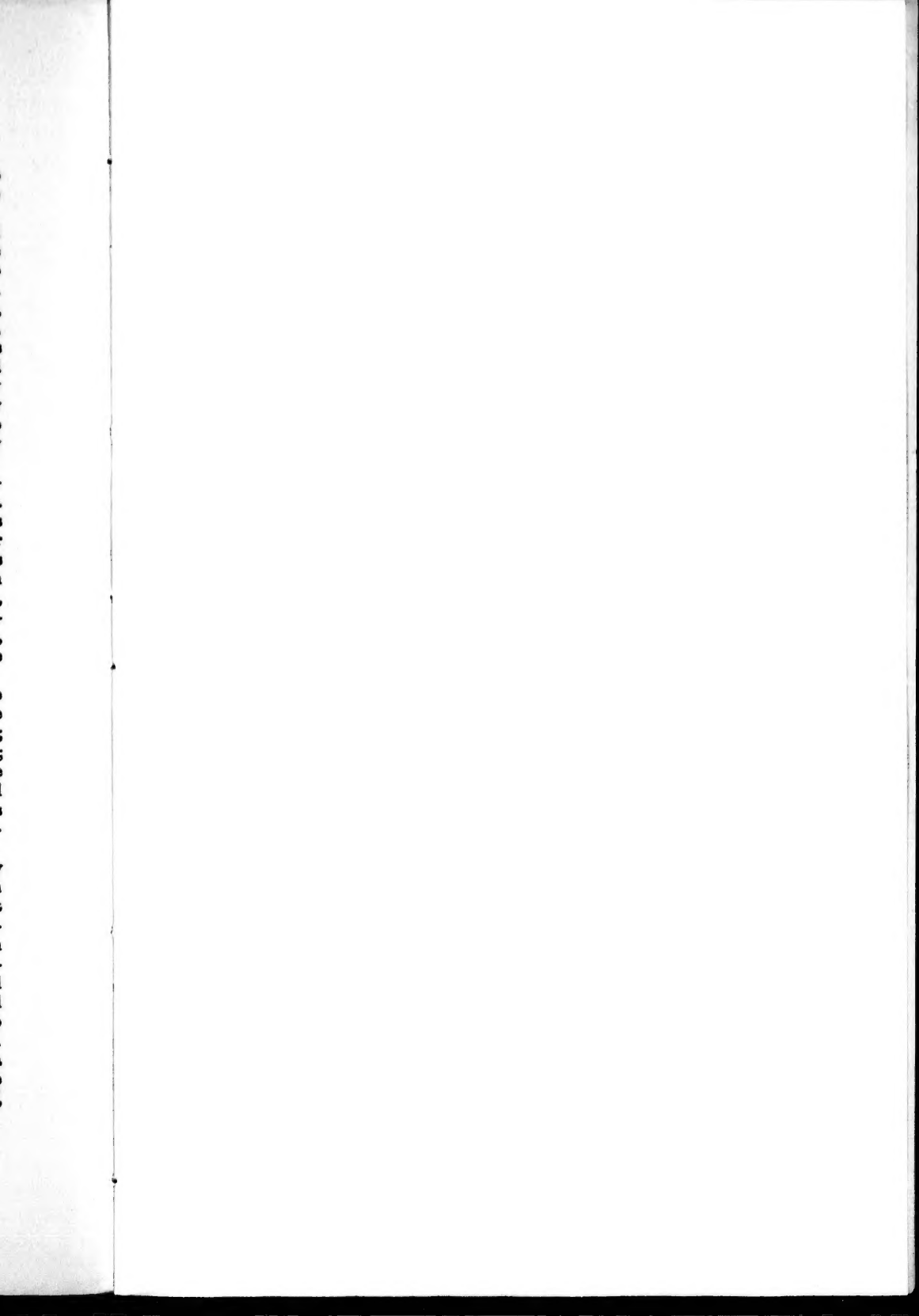
Fuca Strait, and this could doubtless be made by suitable scows in quiet weather. The owners of the Barclay Sound mine state that the ore could be delivered duty paid on the American side for \$1.55 a ton."

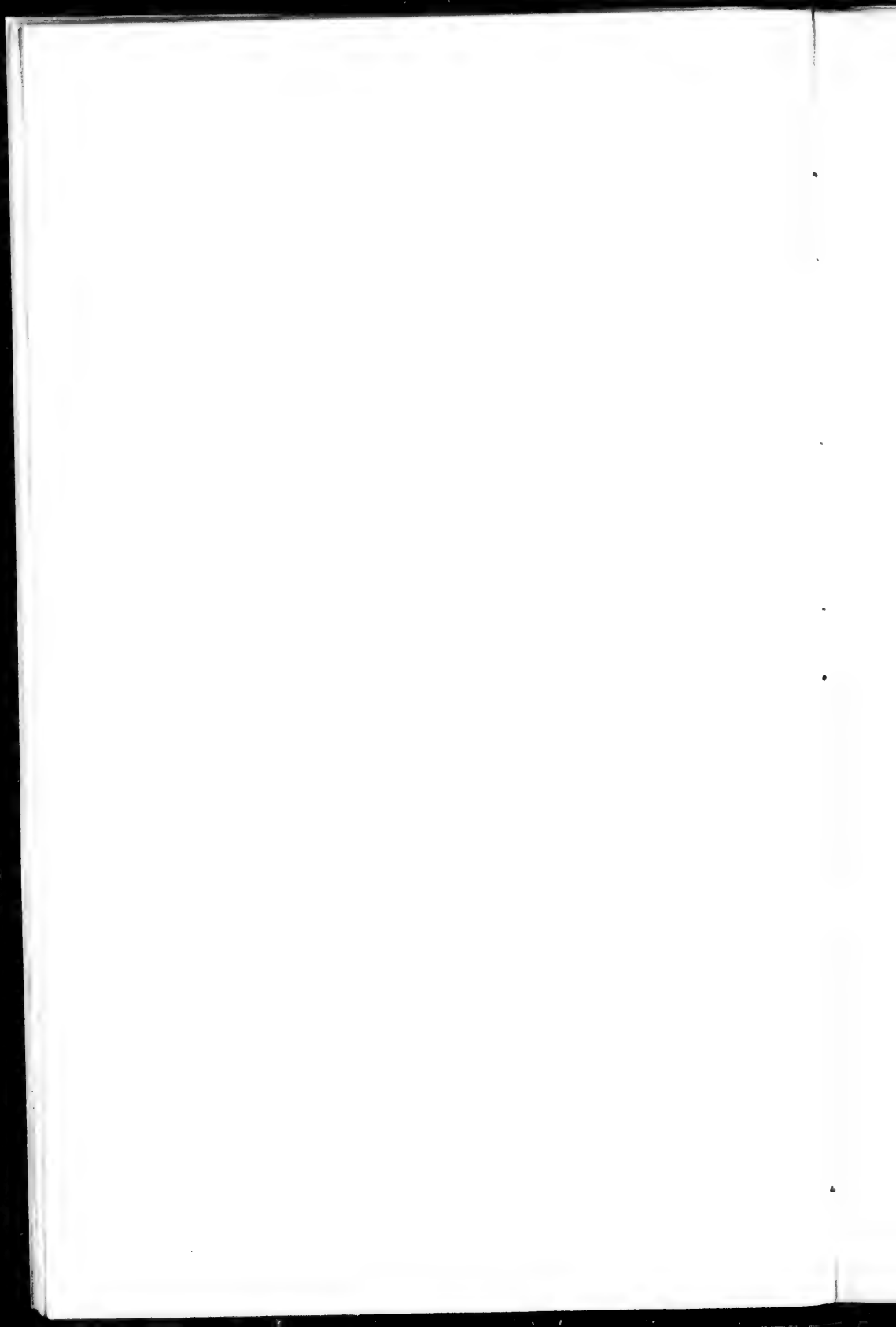
The most remarkable feature in the geology of the south-eastern end of the island is the scooping, grooving, and scratching of the rocks by ice action. The dense felspathic trap already spoken of is ploughed into furrows six to eight inches deep and from six to eighteen inches wide. The sharp peaks of the erupted, intruded rocks have been broken off, and the surface smoothed and polished, as well as grooved and furrowed, by the ice action on a sinking land, giving to the numerous promontories and outlying islands which here stud the coast the appearances of rounded bosses, between which the soil is found to be composed of sedimentary alluvial deposit containing the débris of Tertiary and recent shelly beaches, which have, after a period of depression, been again elevated to form dry land, and to give the present aspect to the physical geography of Vancouver Island.

"As might be looked for in a country so marked by glacial phenomena, the whole surface of the land is strewn with erratic boulders. Great masses of many tons weight are to be found, of various igneous and crystalline as well as of sedimentary rocks, sufficiently hard to bear transportation and attrition. Granites and granitoid rocks of various descriptions are to be met with; trappean rocks of every kind, from whinstone through the whole series—mica-schist with garnets, breccias, and conglomerates. From these granitic boulders, and from the sandstones of the outlying islands, valuable building material is obtained, some of the grey granite equalling in beauty and closeness of crystalline texture the best granites of Aberdeen or Dartmoor."

The general lithological character of the whole island may be described as follows:—Amongst the metamorphic and intruded rocks are gneiss (gneisso-granitic), killas or clay-slate, permeated by quartz veins; quartz and hornblende rocks; compact bituminous slates; serpentine; highly crystalline felspathic traps (bedded and jointed), semi-crystalline concretionary limestone. Amongst the sedimentary are sandstones and stratified limestones crystallised by intruded igneous rocks, carboniferous sandstones, fine and coarse grits, conglomerates and fossiliferous limestones, shales, etc. etc., associated with the seams of coal.

While the last upheaval of the land, which took place at a geologically recent period, failed to connect Vancouver Island with the North American continent, it at all events was sufficient to effect, to a great extent, the junction of numerous insular ridges, and thus to form a connected whole of what had been and might have continued only to be an archipelago of scattered islets. The upheaving force elevated and connected those, and brought to the surface the great clay gravel and sand deposits of the northern drift, which had swept over and been deposited on the submerged land. These sands, gravels, and clays were now to form the surface soil of land prepared in a measure for the use of man. These constituents of the drift remain in many parts thinly covered by a coating of vegetable mould, but much of it has been washed away. The clay remains most generally and widely spread out as a retentive subsoil,





having resting upon it a thick coating of vegetable mould. The most valuable soil is found sweeping down the sides of gentle slopes, filling up hollows and swampy bottoms, and, mixed with the rich alluvial deposits of such districts as Saanich, Cowichan, the delta of Nanaimo, and Comox, forms an almost inexhaustible source of agricultural wealth.

From its insular character and peculiar physical formation, Vancouver Island possesses abundant means of water carriage, as inlets and arms of the sea run up to its most fertile valleys and supply the place of navigable streams. There are no rivers in the stricter sense of the word, such streams as flow through the country being simply the short water-courses which discharge the overflow of lakes or the surface water of the neighbouring ridges—torrents in winter, nearly dry in summer, valuable only as a power for driving machinery, and possibly at a future day to be rendered useful by means of irrigation, a process by which many parts of the country would be much benefited.

Stretching into the heart of the country, lying along the bases of the parallel ridges of trappean rock, are numerous lakes, in some cases forming a continuous chain; others, solitary, lie embosomed among the mountains, and form a beautiful feature in the landscape—placid, clear, and calm they lie among the rocky, pine-clad hills, fringed by the willow, the alder, and the trembling aspen, the tender green of the foliage brightly yet softly reflected in the sunshine from the watery mirror, while stretching across as if to grasp the light, the dark purple outline of the shadow of the frowning peak envelopes the further side in gloom.

It may be found interesting and useful to refer to the principal points along the coast of Vancouver, together with some of the agricultural districts. From Port San Juan, near the entrance to the Strait of Fuca, to Sooke Inlet there is scarcely any settlement. At Sooke there are several good farms, and farmers bring the produce to market by a public road constructed and maintained by the provincial Government.

Esquimalt harbour and Victoria harbour have already been referred to. Connected with the latter there is a scheme proposed by which the harbour is to be enlarged and deepened at an estimated outlay of five million dollars. The proposal is to remove rocks and shoals, and to excavate an area of about 167 acres to a depth of thirty feet at low water, enclose it with a wall built up of the rocks now impeding navigation, and fill the balance behind with the excavated waste material, and thus reclaim about 109 acres of land that would become some of the most valuable property in the city. This reclaimed land in the upper and lower harbour would altogether have a frontage towards the water of about five miles. The engineer and projector (Thomas Sorby) has been voted \$600 by the Victoria City Council towards the expense of proceeding to Ottawa to interview the Dominion Government on the subject. His views have been favourably received. Another proposal is before the City Council, viz., to have certain mud flats at James Bay, near the new parliament buildings, filled in, and a new bridge constructed to replace that now in use.

Saanich peninsula is formed by Saanich Inlet, the south end of which extends to Goldstream station of the Esquimalt and Nanaimo

railway. The waters of Goldstream connect by "the Gorge" with Victoria harbour. The Victoria and Sidney railway runs along the peninsula to Sidney on its north-east corner, where it connects by steamer to Nanaimo. Captain George Henry Richards, of the Admiralty survey, in 1857 described the peninsula "as forming the south-east portion of Vancouver Island, of about twenty miles in a NNW. and SSE. direction, and varying in breadth from eight miles at its southern part to three at its northern. On the southern coast of this peninsula are the harbours of Esquimalt and Victoria, in the neighbourhood of which, for some five miles, the country is pretty thickly wooded, its prevailing feature—lake and mountain, with some considerable tracts of clear and fertile land. The northern portion for about ten miles contains some of the best agricultural land on Vancouver Island. The coast-line is fringed with pine forests, but in the centre it is clear prairie or oak land, much of it under cultivation."

Cowichan valley, including Comiaken, Quamichan, Somenos, and Shawanigan, combine the characteristics of the fertile valleys and prairies which fringe the eastern coast. The valley may be considered to be about fifteen miles' ride upon the sea-coast, narrowing rapidly in a westerly direction to the width of about six miles. It is bounded by high ranges of mountains composed of calcareous sandstones, which form almost impassable barriers to the valley on the north and south. To the disintegration and decomposition of these rocks, all highly charged with carbonate of lime, is due the distinctive character of the soils throughout the Cowichan valley. In their nature they are essentially calcareous, for while other constituents occur in different proportions, in this locality carbonate of lime almost invariably predominates.

Of this soil there is usually a good depth of from two to three feet, resting on a sufficiently retentive subsoil of blue clay or gravel. The earths, chiefly light, very porous, and composed of due proportions of clay, sand, carbonate of lime and humus, are well constituted for absorbing and retaining moisture, and the general colours from brown to black, with the entire absence of chalky or white earths, would likewise indicate a favourable soil for receiving and retaining heat.

Samples taken from the Somenos plains were found by experiment to absorb water sufficient to increase the volume of soil from one-fifth to one-eighth of its whole bulk. Much of the soil along the river bottom is a clay loam of a brown colour, and is excellent for wheat, beans, turnips, and red clover. The alluvial deposit of the valley is, however, far from being all of a clayey nature; in many parts, chiefly on the southern side, the mould rests upon a gravelly, and even a sandy substratum. This is likewise a rich soil, as may be seen from the abundant crops of potatoes, one of the most exhausting of plants, raised by natives on the same patches of land for a series of years.

The soils on the prairie lands are either gravelly or sandy and gravelly loams suitable for barley, oats, rye, buck-wheat, beans, peas, root and leaf crops, potatoes, turnips, carrots, and the usual garden vegetables. Wheat may be successfully raised upon most of the soils, and with proper tillage upon all. The humidity of the atmosphere at

certain seasons may prove a barrier to the cultivation of Indian corn, but there is every probability that grain will one day form a staple, as it will assuredly be a profitable commodity both of consumption and export. In recent years it has been found that with judicious selection of seed, and not planting too early, good crops of Indian corn can be raised in Saanich, Salt Spring Island, and Comox.

The species and variety of plants growing in those rich and fertile districts are numerous; growing on the meadow lands are the following:— "White pea (five to six seeded), wild bean, ground nut, a species of white clover, reed meadow grass, bent spear grass, wild oats, wild timothy, sweet grass, cowslip, crow'sfoot, winter cress, partridge berry, wild sunflower, marigold, wild lettuce, nettles, wild angelica, wild lily, brown leaved rush."

The chief economic woods are the oak and pine. The following list comprises a general summary of the trees and shrubs met with:— "Oak, red or swamp maple, elder, trailing arbutus, crab apple, hazel, red elder, willow, balsam poplar, various species of pine; balsam fir, cedar, barberry, wild red cherry, wild blackberry; yellow plum, choke cherry, black and red raspberry, white raspberry, prickly purple raspberry, prickly gooseberry, swamp gooseberry; several kinds of currants; bear berries, mooseberry, snowberry, blueberry, bilberry, cranberry, whortleberry, red and white mulberry."

Situate eastward from the districts described is Admiral or Salt Spring Island, which is exceedingly fertile and well settled. The brine-springs on the island have been ascertained by analysis to contain 4994 grains of salt per imperial gallon. Admiral Island has two good ports, which are visited weekly by the steamer plying between Victoria and Nanaimo.

From the north end of Admiral Island to Nanaimo there are about twenty miles of coast-line guarded by a chain of islands, between which and the main island are numerous passages, through which the tides course like torrents. The more remarkable of these are known as the "Narrows." Nanaimo harbour is thus described in the *Sailing Directions*: "When the banks are covered, this harbour gives the idea of a large sheet of water, but the deep part is limited, although there is plenty of room for a considerable number of vessels moored."

The coal-fields adjacent to, and under, the harbour, are composed of coarse grits, sandstones, and shales.

The whole deposit, which, from the associated fossils, is shown to be of the Cretaceous age, has undergone much disturbance from the action of volcanic forces in the neighbourhood. Faults are very numerous, and the members of the sedimentary stratified rocks are disturbed and twisted about in a very remarkable manner. Nanaimo is situated about seventy miles from Victoria by sea. The Esquimalt and Nanaimo railway now runs from Victoria to Wellington, where the Dunsmuir mines are, a few miles beyond Nanaimo.

The country surrounding Nanaimo has been divided into the mountain, cedar, and cranberry districts, these names having reference to the character of each. The mountain district contains 16,000 acres. As

its name implies, the general character of the region is mountainous and broken. Crown mountain, connected with this district, although some distance north of Comox, rises to the height of 6082 feet. Numerous other mountains of considerable elevation (Mount Arrowsmith, 5900 feet, etc.) rise along the axis of the island, but many of them are not even located on the maps, or named yet. The only good land lies along the stream known as Millstone river; the grazing, however, is excellent, and the timber, large and small, of the best possible quality.

The description given of the Cowichan and associated districts applies to the cranberry, cedar, and delta plain divisions of this region, the fertile soils being in this case arenaceous loam, and, on the delta plains of the Nanaimo river, vegetable mould of great depth. Nearly the whole of the cedar district, which contains about 11,000 acres, is available for cultivation, and contains some very rich land. "The climate very nearly resembles that of Victoria, the general character of the summer being warm, with little or no rain, but heavy dews; and that of the winter mild, with an average perhaps of ten days' snow; the frosts, though not severe, are of longer continuance. Rain falls in considerable quantities in the spring of the year, and it is generally thought that the average fall exceeds that of England."

The valley of Comox, another fine agricultural district, estimated to contain 300,000 acres of arable land, lies to the north of Nanaimo. It is being rapidly taken up, and produces excellent crops, in fact it is looked upon as one of the best districts on the east of Vancouver Island. The Union coal mines and coke kilns (Dunsmuir property) are situated in this romantic region. The war ships at Esquimalt have their target range off Comox harbour, where they rendezvous for practice at stated intervals each year.

Proceeding north and west, passing Valdes Island and through Johnstone Straits, an excellent route for steamers, abounding in good anchorages, one reaches the extreme north-east point of the island, at Fort Rupert and Hardy Bay. At the latter place there is an excellent harbour, which, it is expected, will soon be utilised by appropriating the surrounding land for settlement, and a town site for manufacturing purposes—saw mills, pulp mills, salmon cannery, etc. At Alert Bay, near the outlet of Nimpkish river, there is a salmon and a clam cannery. A few miles farther on Port McNeill is passed. The carboniferous formation met with at Nanaimo continues to the east side of Hardy Bay, but follows the west side of the harbour and across the country to Cape Scott. The coast along to Cape Scott is flat and the land unsettled.

The western coast of the island, commencing at Cape Scott, possesses a number of remarkable and interesting features. From the cape a group of islands extends westerly for forty miles. It is composed of three large and several smaller ones, "which are high, conical, bare, ninepin rocks." Triangle Island, the westernmost of the group, is a very remarkable bare island 1000 feet in height, having a curious notch on the summit. Between the cape and the nearest islands there is a good clear passage of two or three miles wide. There is excellent fishing in this passage—halibut, cod, etc.

From the group referred to, off and round the coast, southerly, towards Woody Point, "is a bank exactly similar to one which, lying off the entrance of the Straits of Fuca, stretches northerly to near Nootka Sound, and southerly to below the 48° parallel on the coast of the main continent. A middle ground of deep water, extending from Woody Point to below Nootka, separates these banks, which extend westerly to 125° and 126° of W. long, with an average depth of water of from 40 to 100 fathoms, having a gravel or sandy bottom in the shallower, and blue mud in the deeper, parts. These banks get shallower as they stretch westerly, and terminate abruptly at a sharp ridge, beyond which there are no soundings." Both at the north-west and south-south-east extremities of the islands, these banks abound with cod and halibut, and are said to be steadily fished over by United States fishermen without distinction of *meum et teum*. A southerly current prevails along the whole west coast, and often sends ships south of their reckoning.

Immediately south of Cape Scott is Quatsino, an important inlet, with three arms, stretching nearly across the island to Fort Rupert, on the eastern side. A Government trail has been made from Rupert Arm, near Coal harbour, to Hardy Bay. The whole of that country is underlaid with coal. A company is now engaged in exploiting a mine at Coal harbour, and another has applied for a charter to build a tram-railway to Hardy Bay as the best shipping point on the north of Vancouver Island.

"The natives at Quatsino are said to be more primitive than those in any other part of the island. In 1862 they numbered 528, but are diminishing yearly." (In 1898 official returns give 144.)

"Woody Point separates Quatsino from Kyuquot, a district which extends to Nootka Sound. The natives here are very numerous (1862), but were more so a few years ago. There is a feud between them and the Nootka tribe, who have killed a great many of them."

Nootka Sound is a deep inlet possessing few harbours or good anchorages. The small harbour or cove at its entrance is famous as the scene of the Spanish occupation dispute, and an anchorage nearly opposite has a special interest as having been Captain Cook's. The Nootka tribe numbered (in 1862) about 457 in all. (In 1898, reported 257.) Along the whole coast every promontory and bit of level land bears marks of old occupation (a great depth of clam shells), indicating a very numerous population at one time, though the well-known migratory habits of the people must be taken into account.

"Clayoquot Sound differs from all the other inlets of this coast. Its entrance is full of banks and shoals of sand and gravel, instead of a deep muddy bottom. The narrow arms more resemble the neighbouring sounds except in geological feature. A gneisso-granitic rock (metamorphic) forms the axis of elevation, associated with which are hornblende and coarse-grained quartzose rocks, intruded traps, and quartz veins, indicating a region most probably rich in mineral wealth."

"Barclay Sound, situated close to the entrance of Fuca Straits, has a very important position. A somewhat open sound, studded with numer-

ous islands, it possesses several good anchorages, one very convenient to the entrance at Cape Beale. On this cape a lighthouse has been erected. It is connected by telegraph with Victoria. At the upper end of the sound a very remarkable cleft in the mountain ranges, known as Alberni canal, leads, after a course of twenty-five miles, to a level country of considerable extent, heavily timbered with the finest specimens of pine and other woods perhaps anywhere to be seen. Through this 'canal' flows a stream discharging the waters of a chain of lakes which penetrates northerly into the interior. The anchorage is good, and the whole sound, canal, and harbour can nowhere be excelled for the facilities they afford for the promotion and protection of commerce. The natives (in 1862) numbered about 800 or 900 (in 1898, official report gives 196); and here as elsewhere their sole occupation is obtaining food. In 1856 there were over 24,000 Indians on Vancouver Island. The official returns for 1898 show a remnant of only 5395."

A few miles farther south the Indian village of Nitinat is reached. It is situated on a large lagoon, has a number of native residents (official report, 1898, gives 215) and a Methodist Church missionary. There are no agricultural settlers, although some excellent land surrounds the lagoon. A few more miles south brings us to Point Carmanah, opposite Cape Flattery, where the Dominion Government has established a lighthouse and telegraph office, which connects with Port San Juan and other points along the coast to Victoria. This brings the coast sketch along to San Juan, the point of commencement. The interior of Vancouver Island is not as yet explored in some places, and settlement is very scanty, except in the sections referred to in the consecutive descriptions.

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